Studies on the Application of Ketone Resins. (VII) : Application of Acetone Formalin Resin as Adhesives (6)

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63. Studies on the Application of Ketone Resins. (VII)

Application of Acetone Formalin Resin as Adhesives (6).

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In the present paper, experimental results, using calcium hydroxide--hardening reagent--as a substitute for sodium hydroxide are summarixed. Adhesive conditions are similar to those described in the previous paper [1].

Relations among adhesive pressure (kg/cm^2), pressing time (min.), heating temperature (^0C), amount of calcium hydroxide (%) used and add.tion substances on the adhesive strength are shown in Table 1, 2, 3, 4.

Table 1

Adhesive pressure (kg/cm^2)	Adhesive strength (kg/cm^2)	Wet adhesive strength (kg/cm^2)
0	28	0
4	47	0
8	56	9
12	126	24
16	143	48
18	**156**	**51**
20	150	41
23	160	35
31	179	33
39	187	23
47	164	16
58	150	0

Table 2

Pressing time (min)	Adhesive strength (kg/cm^2)	Wet adhesive strength (kg/cm^2)
5	**156**	**51**
10	**157**	**49**
30	136	39
60	84	21

Table 3

Heating temperature (^0C)	Pressing time (5 min.) Adhesive pressure (18 kg/cm^2) Adhesive strength (kg/cm^2)	Wet adhesive strength (kg/cm^2)
60- 70	0	0
70- 80	0	0
80- 90	0	0
90-100	72	0
100-110	150	29
110-120	**156**	**51**
120-130	**162**	**45**
130-140	**151**	**44**
140-150	133	33

Table 4

Amount of calcium hydroxide (%)	Adhesive strength (kg/cm^2)	Wet adhesive strength (kg/cm^2)
0.2	0	0
0.4	76	0
0.6	100	18
1.0	149	39
2.0	161	43
3.0	**176**	**50**
4.0	**163**	**48**
6.0	170	40

From above relations, the following conditions were found preferable for the adhesion of woods using this adhesive mixture.

1) Adhesive mixture.

Resin 10 gr.

Calcium hydroxide (solid) 3–5 gr.

2) Specific pressure applied.

About 18 kg/cm^2 (adhesive strength 150–180 kg/cm^2, wet adhesive strength about 50 kg/cm^2).

3) Pressing time and temperature.

5–10 min. at 110–140°C.

4) Amount of Spread.

Resin 1 gr. per 50–55 cm^2 area.

5) Working life of this mixture.

About 5 days at 5°C

About 15 hours at room temperature.

6) The excellent adhesive strength is obtained by addition of 1% wood powder (80–120 mesh) besides calcium hydroxide and 30% sodium hydroxide solution.

1) R. Nodzu, R. Goto and Y. Kozai; "Wood Research" Bulletin of The Wood Research Institute, Kyoto University. 4 (1950) 50.

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64. The Study on the Reaction of Acetylene under High Pressure. (II)

Preparation of Unsaturated Higher Aldehydes.

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The reaction of acetylene with water under high pressure and at high temperature in the presence of weak basic salt, which is the usual catalyst for such reaction under high temperature, gave unsaturated higher aldehydes and small quantity of aldehyde resin. Zinc acetate, a weak basic salt was used as catalyst. In this case, the yield of aldehyde resin was influenced by temperature, time and presence of solvent. Benzene was found suitable as the solvent, as it is water insoluble and a good solvent for the products. Pressure and temperature have an advantageous effect on the velocity of acetylene-absorption.

Experiment: In a 1*l*-autoclave are put 255 g-water, 45 g-zinc acetate, 1 g-acetic acid and 0.5 g-hydroquinon.

Then the air in the autoclave was replaced by N_2, and acetylene was pressed in to 22.5 atom. The autoclave was shaked at 158°C for 4 hours. After cooling, upper benzene layer was separated from reaction mixture, dried, and distilled in CO_2 atmosphere. The following table shows the fractions of the product.